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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/683,740

10/09/2003

Peiching Ling

IOCC-0203

2794

7590

09/30/2004

Bo-Lin  
13445 Mandoll Drive  
Los Altos, CA 94022

EXAMINER

LEPISTO, RYAN A

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 09/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/683,740

Applicant(s)

LING ET AL.

Examiner

Ryan Lepisto

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 October 2003.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-32 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 09 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. **Claims 1-5, 8, 13, 15-26 and 28-32** are rejected under 35 U.S.C. 102(b) as being anticipated by **Domash (US 5,937,115)**.
2. With regard to **Claims 1, 16, 20 and 24**: Domash teaches a wavelength-selective optical switch comprising (Figures 1, 2, 3A, 3B, 4A-D and 15, 10): a first waveguide (16A, 18A) and a second waveguide (16B, 18B); at least one of said first (16A, 18A) and second (16B, 18B) waveguides comprising an electro-optic material (12) having a set of Bragg gratings (part of 12) disposed therein for interfacing between said first (16A, 18A) and second (16B, 18B) waveguides; and means for generating an electrical field (24A, B) across said electro-optic material (12) for changing an electro-optical characteristic of said electro-optic (12) material for effecting an optical switching function corresponding to said electrical field for electrically tuning and selecting a wavelength to transmit through said set of Bragg gratings (part of 12) (column 9 lines 59-65); and the method for electrically tuning and selecting a wavelength to transmit through a set of Bragg gratings (part of 12) formed with an electro-optic material (12) (column 9 lines 59-65).

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With regard to **claims 2-5, 8, 13 and 15**: Domash teaches the limitations as stated above to reject claim 1, and further teaches; means for generating an electrical field (24A, B) is provided for turning on and off a transmission of an optical signal of a selective and tunable wavelength by changing said electrical field from said first waveguide (16A, 18A) to said second (16B, 18B) waveguide (column 9 lines 27-34), said first waveguide (16A, 18A) intersecting said second (16B, 18B) waveguide and set of Bragg gratings (part of 12) disposed near an intersection between said first (16A, 18A) and second (16B, 18B) waveguides, said electro-optical material (part of 12) comprising an inherent solid material with liquid crystal composites (column 2 lines 64-68) having a tunable electro-optical characteristic (column 9 lines 27-34), and said means for generating an electrical field across said electro-optical material (part of 12) for changing an refraction index of said electro-optic material for effecting an optical switching function corresponding to said electrical field (column 2 lines 52-63).

3. With regard to **claims 17-19**: Domash teaches the limitations as stated above to reject claim 16, and further teaches; a means for applying an electric field (24A, B) over said set of electro-optic material (part of 12) for tuning and selecting a wavelength (column 2 lines 27-34), said electro optic material (part of 12) disposed in a waveguide (10), and said electro optic material disposed in a waveguide (10) coupled to and controlling a signal transmission from an input waveguide (16A, 18A) to an output waveguide (16B, 18B) (column 9 lines 59-64).

4. With regard to **claims 21-23**: Domash teaches the limitations as stated above to reject claim 20, and further teaches; applying an electric field over said

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set of Bragg gratings (12) for tuning and selecting a wavelength (column 9 lines 27-34 and 59-64), forming said set of Bragg gratings (12) in a waveguide (10) comprising said electro optic material (part of 12), forming said set of Bragg gratings (12) in a waveguide (10) comprising said electro optic material (part of 12) and coupling said waveguide to an input waveguide (16A, 18A) to an output waveguide (16B, 18B) for controlling a signal transmission (column 9 lines 59-64).

5. With regard to **claims 25-26 and 28-32**: Domash teaches the limitations as stated above to reject claim 24, and further teaches; one of said first and second waveguides comprising an silicon oxide waveguide (column 20 lines 45-50), means for generating a variable electrical field (24A, B) across said electro-optical material (part of 12) for changing and tuning an electro-optical characteristic of said Bragg gratings for effecting an optical switching and wavelength tuning function corresponding to said variable electrical field (column 9 lines 27-34 and 59-64), said first intersecting said second waveguide with said set of Bragg gratings (12) disposed near an intersection between said first (16A, 18A) and second waveguide (16B, 18B), a substrate (14) for supporting one of said first (16A, 18A) and second (16B, 18B) waveguides; and means for generating an electrical field (24A, B) in parallel (shown in Figure 4B) or non-parallel (perpendicular) (shown in Figure 4C) to a planar direction of said substrate (14) across said electro-optical material (part of 12) for changing an electro-optical characteristic of said Bragg gratings (12) for effecting a change of an optical signal transmission corresponding to said electrical field (column 10

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lines 59-61 and column 11 lines 32-35), and said first (Figure 14, 84) intersecting said second (82A-D) waveguide with said set of Bragg gratings (12) disposed near an intersection between said first (84) and second (82A-D) waveguide wherein said first waveguide (84) disposed vertically above or below said second waveguide (82A-D) along a direction perpendicular to a planar direction of said substrate (shown in Figure 14).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 6-7, 9-12, 14 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Domash and **Kulishov (US 6,353,690 B1)**.

7. With regard to **claims 6-7, 9 and 27**: Domash teaches the limitations described above as used to reject claims 1, 16, 20 and 24.

Domash does not teach expressly the electro-optical material comprising lanthanum-doped lead zirconate titanate (PLZT),  $\text{LiNbO}_3$ , or a ceramic.

Kulishov teaches an electrically adjustable diffraction grating that comprises lanthanum-doped lead zirconate titanate (PLZT) (a ceramic or  $\text{LiNbO}_3$  (column 9 lines 66-68 through column 9 lines 1-3 and column 4 lines 16-19).

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Domash and Kulishov are analogous art because they are from the same field of endeavor, electrically adjustable diffraction gratings.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Domash to include the PLZT or LiNbO<sub>3</sub> material in the grating as taught by Kulishov.

The motivation for doing so would have been to provide a diffraction grating where both the refractive index and the spatial periodicity may be electrically adjusted (Kulishov column 2 lines 11-14).

8. With regard to **claims 9, 11-12 and 14**: Domash teaches the limitations described above as used to reject claims 1, 16, 20 and 24.

Domash does not teach expressly the electro-optical material comprising a non-poled material, a polycrystalline material, a non-ferroelectric material or a relaxor material all having a tunable electro-optical characteristic.

At the time the invention was made, it would be obvious to a person of ordinary skill in the art to modify Domash to include these materials in the grating. Applicant has not disclosed that including these different alternative materials in the grating provides an advantage, is used for a particular purpose, or solves a stated problem, therefore they are not critical to the disclosed invention. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the grating materials taught by Domash (liquid crystal) and Kulishov (PLZT or LiNbO<sub>3</sub>) because these materials have a tunable electro-optical characteristic.

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Therefore, it would have been obvious to one of ordinary skill in this art to modify Domash to obtain the invention as specified in claims 9, 11-12 and 14.

The motivation would have been to provide a diffraction grating where both the refractive index and the spatial periodicity may be electrically adjusted (Kulishov column 2 lines 11-14).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following US Patents teach waveguide switching apparatuses using electrically controlled grating structures: Gaylor et al (US 4,950,042), Deacon et al (US 5,581,642), Yariv (US 5,832,148), Delorme (US 5,838,714), Jain et al (US 6,221,565), Nashimoto et al (US 6,470,125), Xie et al (US 2003/0063831), Domash et al (US 6,567,573) and Jacobowitz et al (US 6,614,948).

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Lepisto whose telephone number is (571) 272-1946. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax



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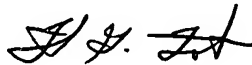
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Ryan Lepisto

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Date: 9/28/04



Frank Font

Supervisory Patent Examiner

Technology Center 2800